

WHAT IS CLAIMED IS:

1. A detecting device comprising:

a transmission line;

an optical pickup which connecting the

5 transmission line and having a photo-detecting element,  
the optical pickup receives a first reference potential  
from a transmission line, sets the potential to a  
second reference potential affected by a noise  
component in the transmission line, generates a  
10 detection signal from the photo-detecting element on  
the basis of the second reference potential, and  
outputs the detection signal and the second reference  
potential through the transmission line; and

a differential amplifier which receives the

15 detection signal and the second reference potential  
from the optical pickup through the transmission line,  
and outputs potential difference between the detection  
signal and the second reference potential.

2. A detecting device according to claim 1,

20 wherein the differential amplifier is operated on the  
basis of a third reference potential having the same  
potential as that of the first reference potential.

3. A detecting device according to claim 1,

25 wherein the differential amplifier is operated on the  
basis of a third reference potential connected to the  
first reference potential.

4. A detecting device according to claim 1,

wherein the differential amplifier has a main portion which generates the first reference potential.

5. A detecting method comprising:

supplying a first reference potential through a transmission line;

setting the potential to a second reference potential affected by a noise component in the transmission line;

10 generating a detection signal from a photo-detecting element on the basis of the second reference potential;

outputting the detection signal and the second reference potential through the transmission line;

15 receiving the detection signal and the second reference potential from the optical pickup through the transmission line; and

outputting potential difference between the detection signal and the second reference potential with a differential amplifier.

20 6. A detecting method according to claim 5, wherein the differential amplifier is operated on the basis of a third reference potential having the same potential as that of the first reference potential.

25 7. A detecting method according to claim 5, wherein the differential amplifier is operated on the basis of a third reference potential connected to the first reference potential.

8. A detecting method according to claim 5,  
wherein the differential amplifier has a main portion  
which generates the first reference potential.

9. An optical disk device comprising:

5        a transmission line;  
            an optical pickup which connecting the  
transmission line and having a photo-detecting element,  
the optical pickup receives a first reference potential  
from a transmission line, sets the potential to a  
10      second reference potential affected by a noise  
component in the transmission line, radiates an optical  
disk with a laser beam to receive the reflected light  
by a photo-detecting element, generates a detection  
signal from the photo-detecting element on the basis of  
15      the second reference potential, and outputs the  
detection signal and the second reference potential  
through the transmission line;

20      a differential amplifier which receives the  
detection signal and the second reference potential  
from the optical pickup through the transmission line,  
and outputs potential difference between the detection  
signal and the second reference potential;

25      a focusing control circuit which generates a  
focusing control signal for moving an objective lens,  
which condenses the laser beam on the optical disk, in  
a direction of an optical axis on the basis of an  
output from the differential amplifier; and

a tracking control circuit which generates a track driving signal for moving the objective lens in a direction crossed at right angles with the optical axis on the basis of the output from the differential  
5 amplifier.

10. An optical disk device according to claim 9, wherein the differential amplifier is operated on the basis of a third reference potential having the same potential as that of the first reference potential.

10. An optical disk device according to claim 9, wherein the differential amplifier is operated on the basis of a third reference potential connected to the first reference potential.

15. An optical disk device according to claim 9, wherein the differential amplifier has a main portion which generates the first reference potential.